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06ELN15/25

First/Second Semester B.E. Degree Examination, May/June 2010
Basic Electronics

Time: 3 hrs. Max. Marks:100

Note: *1.Answer any FIVE full questions, choosing at least two questions from each part.*
2.Answer all objective type questions only on OMR sheet page 5 of the answer booklet.
3.Answer to objective type questions on sheets other than OMR will not be valued.

PART – A

1 a. Choose the correct answer from the following :

i) Semiconductor materials have _____ bonds.
A) Covalent B) Mutual C) Metalic D) Ionic.

ii) Junction breakdown occurs with
A) Forward bias B) Reverse bias C) Active bias D) under high temperature.

iii) In a silicon diode, reverse current is usually
A) Zero B) Very large C) Very small D) In the breakdown region.

iv) In a Zener diode
A) Forward voltage rating is high
B) Negative resistance characteristic exists
C) Sharp breakdown occurs at low reverse voltage
D) None of the above. **(04 Marks)**

b. With diagram and waveform, explain the working principle of full wave rectifier. **(08 Marks)**

c. A half wave rectifier is used to convert 230 V AC in to DC across a load of 1 k Ω. The transformer used is 230 V/12 volts. The DC resistance of the transformer used is 12Ω and the resistance of the diode is 22 Ω. Compute :
i) DC output voltage
ii) The rms value of the output voltage
iii) Ripple factor
iv) Rectification efficiency. **(08 Marks)**

2 a. Choose the correct answer from the following :

i) The DC – Loadline of a transistor circuit
A) Is a curved line B) Has a–ve slope
C) Does not contain Q point D) Gives graphical relation between I_C and I_B.

ii) The correct relationship between α and β is.
A) $\beta = \frac{\alpha}{1-\alpha}$ B) $\alpha = \frac{\beta}{1+\beta}$ C) $\alpha = \frac{\beta}{1-\beta}$ D) $1-\alpha = \frac{1}{1+\beta}$.

iii) In the base region of p-n-p transistor, the main stream of current is
A) Hole current B) Electron current C) Saturation current D) Breakdown current.

iv) The transistor operating point is chosen along the
A) X-axis B) Load line C) Resistance line D) Characteristic. **(04 Marks)**

b. Draw the current components which flow in a transistor. Also derive the equation for I_c in terms of α_{dc}, I_{CBO} and I_B. **(08 Marks)**

c. Draw the input and output characteristics of CE circuit. Explain active, saturation and cut off regions. **(08 Marks)**

3 a. Choose the correct answer from the following :

i) A transistor is a

A) Two terminal device B) Reverse biased device

C) Three terminal device D) Modulated device.

ii) Biasing means

A) Heating the junction B) Applying voltages C) Discharging D) Destroying.

iii) Stability factor for a fixed bias circuit is

A) $1 + \alpha$ B) $1 - \alpha$ C) $1 + \beta$ D) $1 - \beta$.

iv) The operating point must be ___ for proper operation of the transistor

A) High B) Increasing C) Stable D) Decreasing.

(04 Marks)

b. Give the circuit for i) Collector to base bias ii) emitter current bias. Also compare basic bias circuits. **(08 Marks)**

c. For the circuit shown in Fig. Q3(c) using Si transistor with $\beta = 50$, draw the d.c loadline and determine the operating point. **(08 Marks)**

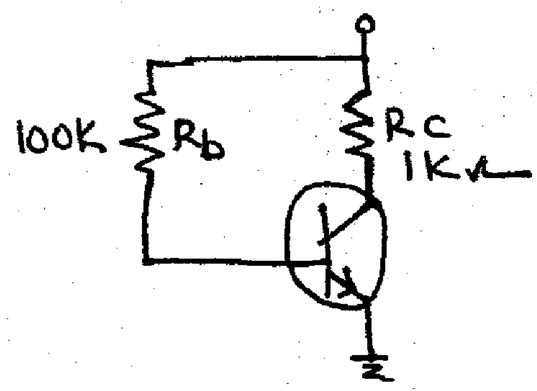

Fig. Q3(c)

4 a. Choose the correct answer from the following :

i) The situation of drain current becoming just saturated is called

A) Forward bias B) Saturation C) Pinch off D) Cutoff.

ii) An SCR is a ____ device

A) Amplifying B) Switching C) Negative D) Blocking.

iii) The minimum point in VI characteristic of UJT is known as ___ point

A) Negative B) Valley C) Latching D) Conducting.

iv) The factor η of UJT is known as ____ ratio.

A) ON B) Pulse C) Negative D) Intrinsic stand–off.

(04 Marks)

b. With the help of equivalent circuit and characteristics, explain the working principle of UJT **(08 Marks)**

c. Draw two transistor equivalent circuit of SCR. Also plot V-I characteristic and explain various regions of operation. **(08 Marks)**

PART - B

5 a. Choose the correct answer from the following :

i) The criteria for producing Oscillations are known as ___ criteria.

A) Doppler B) Bark housen C) Miller D) Band width.

ii) A quartz crystal may be represented by an equivalent circuit consisting of a series ___ circuit.

A) RC B) LC C) RLC D) RL.

iii) The oscillating circuit is also called as

A) Differential B) Tank C) Logic D) CRT.

iv) Unit of gain in logarithmic scale is called

A) Watt B) Joul C) Bel D) Decibel. **(04 Marks)**

b. With circuit, explain the working of BJT RC phase shift oscillator. **(08 Marks)**

c. With circuit, explain the working of two stage RC coupled amplifier and draw its frequency response. **(08 Marks)**

6 a. Choose the correct answer from the following :

i) An inverting amplifier is one that produces ____ phase shift between its input and output voltage.

A) 45° B) 90° C) 360° D) 180°.

ii) An op-amp shorted between inverting terminal and output terminal is called

A) Adder B) Integrator C) Voltage-follower D) inverter.

iii) The op-amp can amplify

A) AC signals only B) DC signals only C) both AC and DC signals D) None of these.

iv) The op-amp integrator uses

A) Inductors B) Miller effect C) Sinusoidal inputs D) Hysteresis. **(04 Marks)**

b. Draw the circuit, using op-amp, for

i) Integrator ii) Differentiator iii) Adder iv) Voltage follower. **(08 Marks)**

c. With diagram, explain main parts of CRT. **(08 Marks)**

7 a. Choose the correct answer from the following :

i) The 1's complement of 1010 gives

A) 1111 B) 0001 C) 0010 D) 1110.

ii) The number 12 in octal is equivalent to decimal

A) 20 B) 12 C) 10 D) 4.

iii) In binary numbers, shifting the binary point one place to the right

A) Devides by 2 B) decreases by 10 C) Increases by 10 D) Multiplies by 2.

iv) To represent 35 in binary, number of bits required is

A) 6 B) 5 C) 4 D) 33. **(04 Marks)**

b. Explain the need for modulation. **(08 Marks)**

c. perform the following :

i) 240_{10} = _____$_2$

ii) 0.2315_{10} = _____$_2$

iii) 3312_8 = _____$_2$

iv) 32198_{10} = _____BCD. **(08 Marks)**

8 a. Choose the correct answer from the following :

i) The expression for half adder carry C with inputs A and B is given by

A) A + B B) AB C) $\overline{A}\,\overline{B}$ D) None of these.

ii) A + AB =

A) AB B) A C) B D) 1 + A.

iii) universal gates are _____ and _____

A) NOT and NOR B) AND and OR C) NAND and NOR D) EXOR and EXNOR.

iv) A + AB + A =

A) AB B) A + B C) A D) O. **(04 Marks)**

b. i) Implement Y=ABCD using two input NAND gates

ii) Simplify $Y = (A + B)\left(\overline{A}+C\right)\left(\overline{B}+C\right)$. **(08 Marks)**

c. With a circuit, explain the working principle of parallel binary adder. **(08 Marks)**

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